93-02295/

Market Opportunities for the Utilization of Wood Waste Generated by Small Sawmills

Sterling Wood Group Inc.

April 13, 1992

STERLING WOOD GROUP INC.

Table of Contents

Executive Summary 1

1.0 Introduction 3

2.0 Objective 4

3.0 Study Methods 4
- 3.1 Gathering Information 4
- 3.2 Literature Review 5
- 3.3 Analysis 5

4.0 Results 6
- 4.1 Survey of Mill Owners 6
- 4.1.1 Summary of Survey Results 6
- 4.1.2 Survey Results by Region 9
- 4.2 MoF/MoE Comments 11
- 4.3 Major Wood Waste Markets 12
- 4.4 Literature review 14
- 4.4.1 Studies Carried Out by B.C. Resource Agencies 14
- 4.4.2 Studies Carried Out by FERIC 15
- 4.4.3 Studies Carried Out by Alberta 15
- 4.5 Economics of Alternative Uses of Wood Waste 16
- 4.5.1 Agricultural Use 16
- 4.5.2 Energy Uses 18
- 4.5.3 Special Wood Products 24

5.0 Conclusions 29

6.0 Recommendations 31

Bibliography: Reports used as resource material

Appendices

Appendix I	News Release-Category II Sawmill Operations
Appendix II	Mill Reports-(Case Studies)
Appendix III	Information Sources (Contacts)
Appendix IV	News Release-Energy Conversion

Executive Summary

Analysis of the amounts and types of wood residue from British Columbia's sawmill and log processing industry have demonstrated that only about one half of the residue is being utilized. Various studies carried out for the Ministry of Forests and the Ministry of the Environment have concentrated on reducing the amount of residue not being utilized. They have determined that increased utilization will mainly be achieved through use for the generation of energy. On the large scale in the province this is probably true, however the utilization of wood residue from the small sawmills will likely need a more innovative approach to the problem. This report is designed to investigate the problem of small mill wood residue utilization and focus on solutions that can be flexible enough to apply to very small mills in isolated locations as well as larger mills closer to established industrial infrastructure.

Provincial timber supplies are under constraint from user groups and the public. The provincial agencies responsible for managing the forest resource are under pressure to ensure that the available timber is allocated for best use to serve all of the public and the public is becoming more and more critical of any real or perceived misuse of the resource. The burning and burying of non-utilized wood residue is seen by the public as unacceptable and many of the small sawmills in B.C. are seen as the source of the problem.

To assist in developing the innovative markets and uses for wood residues from the small mills this study has conducted a series of in depth interviews with sawmill operators, resource agencies and users of wood residue from throughout British Columbia. The user markets include other sawmills; pulp, paper and particleboard plants; energy applications and agricultural uses.

The results of the interviews have been tabulated and analyzed by the consultant to provide the broad spectrum of wood residue uses that are currently available as well as those that are emerging. The results have also been analyzed geographically and conclusions have been drawn about utilization opportunities for different regions of the province.

For many of the small sawmill operations in the more remote areas of the province utilization of sawmill residues is not economical. It should also be noted that currently the burning or burying of wood residue is a significant cost to most of the small mill operators and as the environmental regulations become more stringent the cost and difficulty of handling residue will increase. Utilization, even if non economical, becomes a valid option when compared to disposal.

Through the research carried out in this study the consultant found that there are a number of emerging markets for wood residue, many of these in the agriculture field. The report covers the major technical requirements for these and other markets with the objective of assisting small operators to economically utilize wood residues and reduce the volume wasted.

The report sets out a number of conclusions appurtenant to the wood residue problem faced by the smaller mills in B.C. and some recommendations are presented for consideration by the Ministry of Forests and other agencies. The report suggests that some flexibility will be required regionally in the application of environmental and forest service regulations. The flexibility is required to reflect the economic factors affecting small mills in isolated areas. Operators that are making significant effort to improve utilization even though some burning or landfill is necessary can be further encouraged to invest in new markets for by-products if they continue to have some security of timber supply.

The report also recommends that continued government initiative be supported to help operators in the technical aspects of the new markets for wood residue. This support can be in the form of extension services, marketing help and government help such as the environmental credit for conversion of wood waste to co-generation of energy.

1.0 Introduction

This study has been commissioned to focus attention on the wood residues from small sawmills in British Columbia and to look for solutions to economically utilize more of the residue. The volume of residue created in the sawmills, pulp and paper, veneer, shake and shingle, chipping and pole and piling plants within the province is approximately 9 million bone dry tonnes (BDMts) and only about 50% of this volume is currently utilized. Within the mills included in small business sector the proportionate amount of residue is probably higher than for the larger mills. While utilization of residue ranges from none to 100%, the average is probably less than 50%. It has been estimated that about 50% of the solid wood content of logs entering the small mills becomes residue requiring disposal. Lumber recovery for larger mills is on average better than for the mills included in this study.

Most of the waste problem for the small mills results because of the small scale of operations. The Ministry of Forests many years ago developed a policy to encourage small scale logging and sawmill operations to help offset the growing corporate concentration in the forest industry. The forest service program, known as the Small Business Forest Enterprise Program (SBFEP), was allocated a portion of the Allowable Cut from the provincial forests. Each Timber Supply Area (TSA) has now a specific volume allocated for the SBFEP. In 1989 the program was given access to 12.5% of the AAC on a province wide basis with some variation within regions and TSAs. The allotment is further divided between Category I (Loggers) and Category II (Sawmills) in most regions to provide a balance reflecting the regional economy.

Public pressure to increase the volume of timber to be made available to the SBFEP and the need to adjust cutting levels downward in a number of the TSAs has caused the Ministry of Forests to study the situation and recommend changes in public policy and regulation. Environmental concerns have also been raised over the residue disposal practices within the forest industry in the province. Traditional disposal by open burning and by landfill will be regulated more stringently in the future and will eventually be phased out. In some locations the environmental concerns are already resulting in changes in the manner of handling residues. The need to resolve the residue problem has been linked to timber supply for small sawmills by a 1991 policy decision made by the Minister of Forests. The news release covering this policy change is attached to this report as Appendix I.

The new policy will prevent new sawmills from being registered under the SBFEP while at the same time requiring the existing small mills to install or utilize chippers and de-barkers to help utilize wood residue. If the small mills can demonstrate their intent for improved utilization of their wood residues they will be eligible for exemption to the chipper, de-barker requirement.

This study explored the utilization potential for the residue throughout the province and reviewed the economics as it applies to the small mills. Where some small mills have apparently solved the disposal problem this analysis presents the solution as case studies so that the solution can be applied to other mills. The consultant has visited these mills to gather additional information in order to assist in drawing the general conclusions for this report. See mill reports-Appendix II.

2.0 Objective

To determine through analysis, the problems and potential solutions to the wood waste developed from small sawmills throughout British Columbia.

The achievement of the objective requires an understanding of the existing infrastructure in the major regions of the province and the solutions vary depending on the local economics. Markets and marketing strategy are essential components of the study and recommendations that will apply to small mill operations are included.

Recommendations are prepared that will assist in achieving the overall objective of economically reducing wood waste from small sawmills in British Columbia.

3.0 Study Methods

3.1 Gathering Information

Previous studies carried out to investigate the mill residue problems within British Columbia focused on the industry as a whole. This analysis is limited to the investigation of and solutions to the residue problems for small mills within the province. The terms of reference specify that the study be limited to mills that are registered under the category II of SBFEP. The study is limited further to eliminate those mills classed as re-manufacturing mills as these normally obtain their wood supply in the form of lumber from other producers. To enable a comprehensive review of the problem throughout the province the Ministry of Forests provided the consultant with a list of active mill owners registered under the SBFEP.

This list was examined and represents mills from all of the forest regions and most of the forest districts were contacted by telephone and asked to respond to specific questions related to their mill, their timber supply, the products they manufacture and the type and handling of mill residue. Mill operators were also asked to comment on the importance of the problems and how the problems could be solved.

The information gathered through the canvassing approach was summarized by region and by type of problem and potential solution.

Following the gathering of information and comments from the mill operators, Ministry of Forests and the Ministry of Environment, Lands & Parks staff throughout the province were contacted and asked to verify the status and practices concluded by the consultant from the canvassing.

The major markets for sawmill residue continue to be the province's pulp and paper mills. Representatives from these mills as well as other user groups such as fibreboard plants, agriculture agencies, and co-generation proponents were canvassed by the consultant to determine the current markets and economics for wood residue. Constraints and opportunities for further use of mill wood residue were solicited from this group.

Sources of information for this analysis have been documented and are recorded in the report as Appendix II.

3.2 Literature Review

Reports relevant to the manufacture and use of wood chips, hog fuel, sawdust, bark and other wood residue materials from sawmills and log handling yards were collected and reviewed. In addition the report prepared for the Ministry of Forests in 1991, entitled *Towards Improved Utilization of Forest Industry Mill Residues in British Columbia* was analyzed and used by the consultant for base data on the economics of some of the options for future waste reduction or conversion to marketable products.

3.3 Analysis

The consultant team adopted a think-tank approach to solving the problems faced by the operators of small sawmills to economically utilize and market their wood residues. The emphasis was placed on the adoption of innovative and unique solutions keeping in mind that solutions must also be practical.

4.0 Results

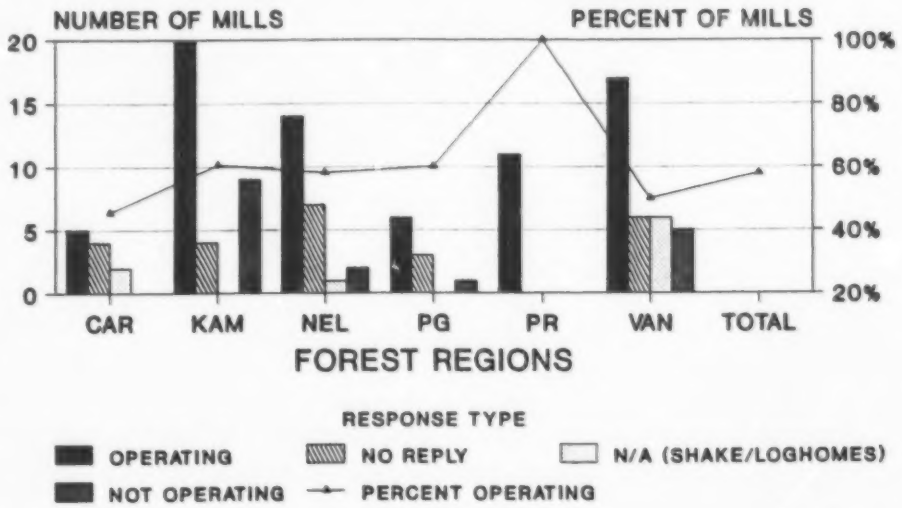
4.1 Survey of Mill Owners

4.1.1 Summary of Survey Results

125 sawmill operations were contacted in the six forest regions of the province to gather representative information on the wood residue from small sawmills. The consultant succeeded in gathering the required information from 72 of the mills, got no reply from 24 and found the balance to be not applicable to the survey because they were not in service or were incorrectly classified as small sawmills. The response, by region, is displayed in chart 1 which follows.

Chart 1

MOF SMALL SAWMILL STUDY
RESPONSE TO INTERVIEWS



Analysis of the responses was carried out for each region to determine what, if any, unique problems or situations existed by location. Each mill operator was asked to respond to questions about log usage, type of equipment in service, mill product waste disposal methods and problems and the utilization of wood residues by product. The results of the responses are displayed in the following charts. In Chart 2 the term 2nd process means secondary sawmilling processes are uses din the mill. This means the mill manufactures lumber beyond the primary breakdown phase.

Chart 2

MOF SMALL SAWMILL STUDY
MILL EQUIPMENT

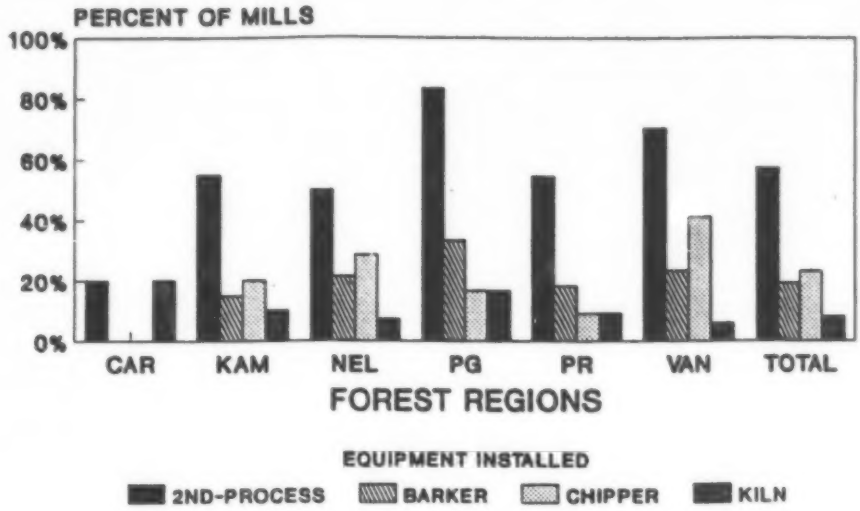


Chart 3

MOF SMALL SAWMILL STUDY
MILL PRODUCTS

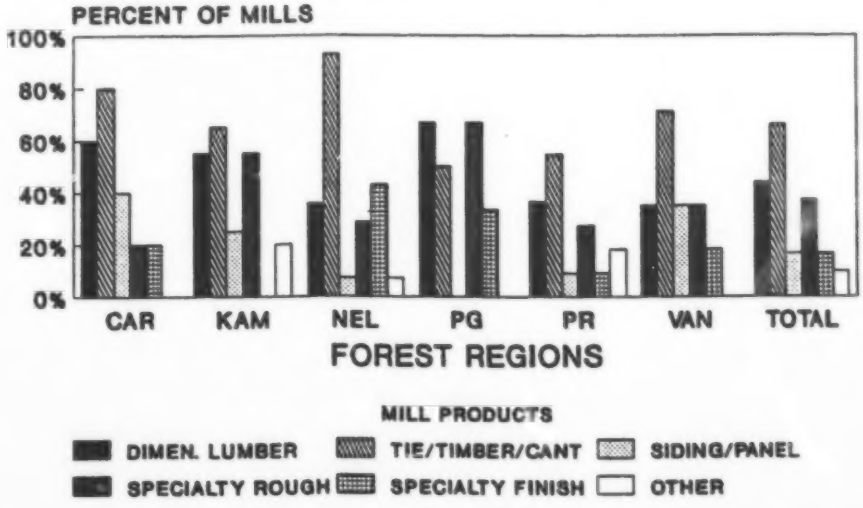


Chart 4

MOF SMALL SAWMILL STUDY
% OF MILLS WITH VARIOUS WASTE PRODUCTS

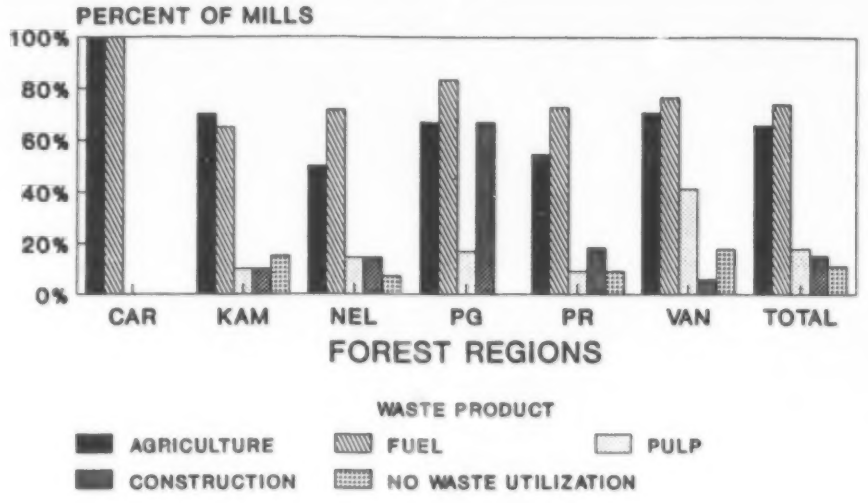
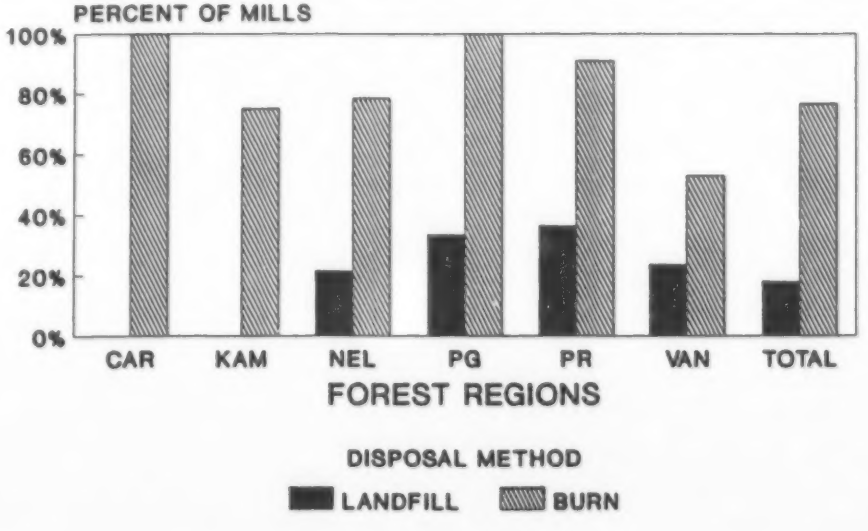


Chart 4

MOF SMALL SAWMILL STUDY
WASTE DISPOSAL METHOD



4.1.2 Survey Results by Region

Many of the survey results are common throughout the province and the following comments are presented to help summarize the more unique aspects found in each region.

Cariboo Region

Mills in the region are generally small, primitive and often isolated from facilities and communities. As a result, the opportunity to market residue is limited to those mills close to the communities. Most of the mills burn their residue although agricultural markets for sawdust are available for some of the mills . The major wood products for the Cariboo Category II mills are timbers, dimension lumber and cants.

Kamloops Region

Over 50% of the small mills in this region have secondary processing and indicate that they can market their residue for both fuel and agriculture products. The Weyerhauser pulp mill in Kamloops is the major user of chips, hog fuel and sawdust in the region although other markets are also developing. Some burning continues for those mills too isolated or too small to utilize residues.

Nelson Region

The Nelson region contains a large number of small sawmills, most of them cutting timbers, ties or cants. The industry is fairly integrated in the area and much of the production from the small mills ends in secondary manufacturing plants in the area. There are two pulp mills in the area, Celgar Pulp in Castlegar and Crestbrook Pulp in Skookumchuck. The Celgar mill relies 100% on the residual chips from local sawmills while the Crestbrook mill has substantial company timber holdings to supply logs to sawmill and for chipping. Strong chip markets are expected in the region for the long term and other markets will be available for hog fuel throughout the region. Burning of residue is a serious problem in the region and most of the small mills realize that they will have to solve the problem soon.

Prince George Region

Approximately 80% of the small mills in the Prince George region have secondary manufacturing equipment and are geared to supply chips and hog fuel to the pulp mills in Prince George and in Quesnell. The more isolated of the small mills still cannot afford to haul residue to the large centres and burning is still common in these areas.

Prince Rupert Region

Small mills in this region are generally spread out along Highway 16 and most of them have some secondary manufacturing facilities. The major product is ties with dimension lumber of secondary importance. Utilization in the region is a problem as there is limited market for hog fuel with pulp mills located only in Kitimat and at Port Edwards. Many of the fuel users in the area claim that natural gas is cheaper than hog fuel. Disposal by landfill is the preferred means although currently most are still burning.

Vancouver Region

The mills canvassed in the Vancouver region range from large operations with no timber tenure other than timber sales to very small one man mills. Many of the mills are only cutting cedar and are producing typical cedar products such as siding, cants and lumber for secondary manufacture. Well established markets are available for all of the wood residue products although prices paid for hog fuel and sawdust barely cover the cost of handling for the mill operator. In the more populated area of the region the environmental restrictions prevent burning of wood residue and most of the small mills are starting to utilize the material.

4.2 MoF/MoE Comments

Representatives from the provincial forest service and the Ministry of the Environment Lands and Parks were interviewed by the consultant to verify the survey results and comments from the mill operators. The regional and district representatives were aware of some success stories related to small mills utilizing residual material. The Ministry of Forests in some areas no longer issues permission for sawmill establishment on public land in order to avoid involvement in the problems of waste disposal from sawmills.

The Ministry of the Environment is responsible to administer regulations pertaining to the protection of air and water quality throughout the province and in some regions disposal of sawmill residue is a significant environmental problem. The ministry has had only limited success trying to get cooperative use by small mills of central approved waste burners. The more stringent emission standards cannot be met, however, even by the so called smokeless burners, mainly because the burners are not operated on a continuous basis. The Nelson region has the most serious environmental problems, partly because of the large number of small mills and partly because weather and geographic conditions permit only infrequent periods where safe open burning of wood residue is possible.

The growing environmental pressures may result in operational problems for some of the small mill operators. These operators perceive the restrictions as being serious enough to force them out of business if they cannot be solved. Comments from forest and environment ministry officials in the interior regions of the province indicate that the requirement for Category II mills to establish de-barking and chipping facilities may force many of the smaller mills to look elsewhere for their log supply. Other sources of logs that these mills can utilize are:

- custom cutting logs for others with specific markets.
- logs from private lands.
- purchase of log types not presently utilized by established mills.

The officials have also commented that the small mills with success in residue utilization have been those that are closely associated with other mills and have focused on niche markets for their lumber and their residue.

4.3 Major Wood Residue Markets

The major markets for wood residue from sawmills and other primary log users are the pulp, paper and particleboard plants that form the integrated British Columbia forest industry. The recent plant expansions at Gold River, Castlegar and Port Mellon will result in some changes in demand in those areas and the growing utilization of wood residue in agriculture and for energy generation will also change demand in the areas where development is taking place. Other major projects related to the use of wood products and wood residue have been completed or are underway in other parts of the province. These are projects such as log chipping facilities in Chilliwack, Prince George and Cache Creek; chip facilities in log sorting yards and others. The recent changes all indicate the trend to increase in residue utilization. The annual publication prepared by the Ministry of Forests of major primary timber processing facilities includes a listing of chipping facilities, pulp and paper mills and other mills. Other users of wood residue for energy or agricultural purposes are not listed in this document but can be determined through other channels. Current status of the markets throughout B.C. have been reviewed through canvassing representatives from pulp mills, nurseries, trucking industry and composting operations. The results for each of the use categories are reviewed in Section 4.5 of this report.

Table #1 which follows shows the major markets for the components of sawmill wood residue.

Table 1

B.C. MARKETS FOR WOOD RESIDUE MATERIAL

MARKETS		BARK	SAWDUST	SLABS	HOG FUEL	CHIPS	SHAVINGS
PULP:			X			X	
ENERGY:	Dry Kilns				X		X
	Pulp Mills				X	X	X
	Green Houses				X		X
	Firewood			X			
	Pellets/Briquettes		X		X		X
AGRICULTURE:	Turf Farms		X		X		
	Nursery Bedding	X	X		X		X
	Animal Bedding		X		X		X
	Composting	X	X		X	X	X
CONSTRUCTION:	Particle Board		X				
	Rustic Siding & Rough Lumber			X			
OTHER:	Trail Surfacing				X	X	
	Landscaping	X			X	X	
	Domestic Pet Bedding						X

4.4 Literature review

4.4.1 Studies Carried Out by B.C. Resource Agencies

The Simons Strategic Services Division February 1991 report dealing with improved utilization of mill residues made use of the August 1990 report prepared by Stewart & Ewing Associates Ltd. (Seafor) which quantified the volumes of mill residue by region and by type for the year 1989. The Simons report is a comprehensive analysis of the mill residue problem for mills of all sizes and types within the province. Within the province over 50% of the estimated 9 (BDMts) is bark. The Seafor report also states that only about 50% of the residue is being utilized with the balance either burned or placed into landfill.

Environmental and public pressures are mounting and the methods of disposal may not be permitted for much longer, particularly in the more populated areas.

The major factors preventing economic utilization at this time are:

- mixed and contaminated residues
- high moisture content (lower calorific values)
- emission and corrosion problems (mainly salt water)
- low value added through conversion (usually high capital cost) - alternative energy is cheaper (natural gas)
- transportation cost exceeds value at the market

The report looked at various options to utilize mill residues. These ranged from manufacture of wood products to energy production. In the case of energy options the report includes some detailed and case study economics for such uses as residential fuel pellets, industrial fuel pellets, heating of dry kilns and use of pulverized wood fuel for boilers. The report is most useful for those firms with large volumes of wood residue and practical application for the smaller mills will require cooperative ventures between local mills or use of specialized wood residue marketing services.

Other studies carried out for the Environment and the Economic Development ministries have centred on the utilization of wood residue primarily into energy generation. Sandwell Inc. have carried out a number of regional studies throughout the province with analysis of opportunities for utilization of wood residue. The Thompson - Okanagan report is representative of the reports and is referred to in the bibliography to this study. Within the report are current estimates of the type and volume of wood residue for the region and estimates of the competition or demand predicted for the proposed or possible uses. If all of the proposed co-generation plants are built then the present volume of residue will be fully utilized. The conclusion can be reached that in the future wood residue will have a higher

value as a by-product to the sawmill than exists today. Currently nearly every mill is content to give hog fuel away and hope for at least some financial support for trucking the fuel to a user. In the Okanagan the average trucking cost for hog fuel is estimated to be $0.15 per BDU per kilometre. Sandwell have gone on to calculate the trucking cost per gigajoule. Sandwell have calculated that the break even haul distance for the Cariboo co-generation plant in Williams Lake based upon realistic electric rates is 256 kilometres .

4.4.2 Studies Carried Out by FERIC

The Forest Engineering Research Institute of Canada (FERIC) has carried out a number of trials and studies within B.C. and Alberta related to the processing of small logs into chips. The studies look at disposal of log yard residue, debarking and chipping equipment, procedures and economics. The problems of handling wood waste and small logs in the log yards are similar to those of the sawmills and the same environmental pressures are forcing changes in procedures and economics. The trend towards having barking, chipping and hogging facilities at log handling yards will offer another option to sawmills close enough to the yard for the disposal of their residue. The capital cost to establish the barking and chipping facilities in the log handling yards is estimated to range between $1.2 and $1.9 million depending on the size and permanence of the installations. The cost per hour to operate the facilities ranges from about $284 to $555 and the production ranges between 12,000 and 72,000 Bone Dry Units (BDU) per year. Table 3 page 26 provides conversion factors for various species and units. The FERIC studies do not include conversion of waste to hog fuel.

4.4.3 Studies Carried Out by Alberta

The studies on wood residue in Alberta parallel those undertaken in B.C. and the conclusions are supportive of those carried out for the MoF in B.C. It is interesting that the report prepared by Silvacom in March of 1990 suggested that as long as natural gas delivered costs remain between $2.00 and $2.50 per gigajoule the utilization of wood residue for fuel is not economical.

In the summary of proceedings for the wood residue conference held in Alberta in 1991 there was a review of environmental practices in some of the U.S. states. In Oregon the utilization of wood residue has advanced to the status where very little remains without a market. Part of the success is due to the shorter transportation network and part as a result of the advanced state of the industrial and agriculture infrastructure. In Oregon there are a number of smaller (20 Megawatt) co-generation plants so that trucking of hog fuel rarely exceeds 30 km.

Unique also in Oregon is the development of the forest residue by-product brokerage business. As in British Columbia the log buying station is developing, in Oregon the wood residue handling yards are evolving.

4.5 Economics of Alternative Uses of Wood Waste

4.5.1 Agricultural Use

Many of the small mills are located in remote areas of the province where access to markets for the conventional wood residue products, chips and hog fuel is not economical. In these areas there is often an agricultural industry that can make good use of some wood residues. The survey for this study revealed that many of the mill operators were also in the ranching or farming business. Some innovative uses for agricultural use are discussed in the following paragraphs.

Animal bedding

Sawdust and planer shavings from the small mills, if not contaminated with soil, can be used for animal bedding.
The *1990 Analysis of Wood Residues in Alberta* stated that the main use of wood residue for animal bedding was from planer shavings and this use was not a revenue source but used as a means of avoiding the cost and trouble of burning. The broiler chicken industry in B.C. is concentrated in the Fraser Valley, however there are other large chicken operations on Vancouver Island and in the Okanagan. These operations utilize large quantities of sawdust for bedding. Sawdust for bedding is also utilized on dairy farms. On Vancouver Island sawdust costs about $18.00 per GPU delivered and up to $30.00 in the Fraser Valley.

Ministry of Agriculture staff have advised that contamination of sawdust and shavings with chemicals used for stain or pest control will prevent the sawdust from being used as animal bedding material. Small sawmills that do not use anti-stain or other chemical treatment may be able to capitalize on this market.

Composting

There are a growing number of composting operations within British Columbia. The process makes use of biodegradable material with a high carbon content and through mixing with organic material, high in nitrogen, produces a compost material which is used directly in agriculture. Although straw and waste newsprint are the preferred sources of carbon, wood residues are high in carbon and can be used to mix with organic material such as septage waste, aquaculture waste, animal manure and garbage.

The Answer Garden Products in Matsqui has a $3 million plant for producing compost which is the basis of commercial products including potting soil and fertilizer. The plant employs 14 people. They use chicken manure which already has a large component of sawdust included from bedding material. Sawdust is added to obtain the correct ratio of carbon and nitrogen. The components are regularly mixed and air is forced into the mixture to speed the composting process.

There are a number of composting operations in many regions of the province utilizing wood residue from sawmills. They use a wide variety of organic material from garbage collection, chicken, pig, cattle and dairy manure, septage from septic tanks and sewage treatment plants. The following is a partial list:

- Vernon - Lawn and Garden Service
- Aldergrove - Fred Reid
- Terrace - poultry manure
- Parksville - pig manure
- Surrey - pig manure
- Comox - septage and fish waste
- Nanaimo - septage
- Williams Lake - septage
- Kelowna - poultry manure
- Abbottsford - pig manure
- Campbell River - fish waste
- Ucluelet/Port Alberni - fish waste
- Sechelt/Gibsons - fish waste
- Surrey - mushroom co-op
- Princeton
- Chilliwack
- Merritt - sewer treatment plant sludge
- Comox Strathcona Regional District - sewer treatment plant sludge

At the UBC Experimental Farm at Oyster River a plant is under construction to process fish waste. It will use approximately 7500 wet tonnes of sawdust per year. Niels Holbeck, the manager, estimates a cost of $18 per GPU for the sawdust delivered. The plant will produce a soil conditioner selling wholesale at $1.50 for a 20 lb bag.

The increasing demand for sawdust and hog fuel may result in price increases in some regions such as the Fraser Valley. Small sawmill operators may gain significant revenues by being aware of the potential and providing a residue product that best meets the needs of the user.

The wood residue used can be sawdust or pulverized (hogged) solid wood and bark. Even cedar can be used in the process despite the presence of natural oils in the wood.

The Ministry of Agriculture is anxious to extend their knowledge to increase the use of composting in B.C.

Turf Farms

Growers of turf for the residential landscaping market normally replenish the soil they remove with each crop with a mixture of soil and sand. The expense and source of replacement material is an increasing concern to these farmers and some experimentation with use of wood residues has been undertaken. The experiments using sawdust as a replacement have failed because the composting of the sawdust causes liquidation of the nitrogen in the soil. A process being developed in the U.S.A. makes use of crushed and ground-up bark laid as a bedding material on a layer of polyethylene plastic. Grass seed is spread on the bark and held in a place by a netting. The turf is then grown under hydroponic conditions for market.

Nursery bedding

Bark mulch or sawdust has been common in garden and nursery use for some time. Many of the sawmill operators interviewed have conventionally disposed of sawdust for nursery use around bedding plants and garden pathways. As a general rule the mill receives little or no revenue for sawdust but avoids the cost of trucking to landfill or burning.

4.5.2 Energy Uses

Wood residue that is not utilized is normally burned on site in beehive or olivene burners or in open burn piles. In all cases disposal by burning requires approval of the Ministry of the Environment and attainment of increasing emission standards. Open burning is very closely regulated both by the MoF and the MoE to ensure pollution and fire safety standards are met. The use of wood residues for production of energy is taking on a more important role as the cost and complexity of disposal increases.

In other instances where burning is not practical or permitted, the only means of disposal is into landfill. Landfill disposal is also regulated by the MoE and regulations are becoming more stringent each year. New Federal Government guidelines will also add to the cost burden for mills presently disposing of wood residues in landfills.

Programs to utilize the wood residue from small mills are obviously favoured over disposal methods. Agricultural uses are very successful for the small mills because of the proximity of mills and farms and the type of material produced at the mills fits with the agriculture uses. Use for energy generation is also possible for residues from the small mills. Contamination of residue by dirt and rocks is the most serious problem facing the economic marketing for many of the energy applications.

Mills smaller than 20 thousand board feet (Mfbm) per day or 5.0 million board feet (MMfbm) per year usually cannot afford the capital and operating expense of both barkers and chippers. The residue from these small mills therefore, will consist of slabs and bark mixed together and sawdust which is separate. In these situations except for the larger slabs which can be separated for their lumber resaw value, the residue can best be disposed of by hogging or pulverizing and marketing as fuel or agricultural products.

For small mills the investment needs to establish even a rudimentary hog fuel facility will be about $30,000 with used equipment. The used plant will probably cost about $15,000 and the foundation, conveyors, hopper and setup costs will make up the balance.

Fuel Pellets/Briquettes

Many small sawmills dispose of their slabs edgings and trim ends as firewood and while this is a fuel product it is discussed in this report in Section 4.5.3 dealing with recovery of special products from mill residues. The economics of utilizing wood residue fuel pellets for residential use has been the subject of a number of studies and reports. The Simons report presented a detailed estimate of capital and operating costs for a hypothetical pellet plant in B.C.

Capital costs estimated by Simons at $1.6 million for a 20,000 Oven Dry Tonne (ODT) per year plant and facilities. No cost is estimated for land, running equipment or working capital. With revenue of $80 per tonne, operating cost of $369,000 per year and raw fuel cost of $10. per BDMt the report showed that operation can provide a profit of $1. million before taxes. A similar analysis was carried out and reported on in the Dec. 1989 Forest Industries magazine by Helmuth Resch. Resch's analysis was for plants of 160 and 240 tons per day capacity, initial capital cost of about $ US 2.4 million and operating costs between $ US 40 and $ US 45 per ton including raw wood cost of $ US 25 per ton. Neither of the analyses considered the cost of bagging the product for the retail market. This cost has been estimated at about $.89 per bag or $36 per ton.

Small sawmills cannot afford the investment nor provide the volume of hog fuel required to establish pellet plants as discussed in the examples noted in these studies. Some small sawmills interviewed have investigated the opportunity to construct their own small pellet or briquette plants with used equipment and utilizing fairly dry sawdust as a base. This permits a plant with much less capital investment. Other mills are anxious to supply hog fuel to any pellet plant that can be established in their area.

The following table shows a comparison of competing fuel sources for residential heating based on various price ranges and assumed efficiencies. The natural gas rates are the current tariffs approved by the B.C. Utilities Commission for residential use. There are many variations in rates even within each jurisdiction and the rates shown are therefore only approximate to show the potential for conversion from one system to another.

Only in areas with high natural gas prices, such as Vancouver Island, is the price of fuel pellets competitive as a source of residential heat.

Table #2

Fuel Costs - A Comparison

Fuel & Efficiency	Jurisdiction (Natural Gas Only)	Price	Cost/Gigajoule Useable heat
Wood/Bark Pellets 78%		Per Tonne	dollars
		60.00	4.14
		65.00	4.49
		70.00	4.84
		75.00	5.18
		80.00	5.53
		85.00	5.87
		90.00	6.22
		95.00	6.56
		100.00	6.91
		105.00	7.25
		110.00	7.60
		115.00	7.94
		120.00	8.29
Electricity 95%		per KWhr	
		0.035	10.23
		0.045	13.15
		0.055	16.08
		0.065	19.01
		0.075	21.91
Propane 78%		Per Litre	
		0.15	7.62
		0.16	8.13
		0.17	8.63
		0.18	9.14
		0.19	9.65
		0.20	10.16
		0.21	10.67
		0.22	11.17
		0.23	11.68
		0.24	12.19
		0.25	12.70
Natural Gas 82.5% (range 80-85%)		Dollars per Gigajoule	
	BC Gas Lower Mainland	4.366	5.29
	BC Gas Interior	4.894	5.93
	Columbia Nat. Gas	3.652	4.43
	Fort Nelson Gas Co.	3.187	3.86
	Pacific Northern	4.940	5.99
	Northland (Dawson Cr.)	3.230	3.92
	Northland (Tumbler R.)	4.433	5.37
	Centra Gas Ft. St. John	3.698	4.48
	Centra Gas Vancouver Is.	7.310	8.86

Table: Values for Pellets, Electricity and Propane from Wood Residue Utilization in Crowsnest Pass Region, Silvacom, 1990
1 Gigajoule = 1 joule X 10^9 = the amount of work done by a current of 1 amp. for 1 sec. against a resistance of 1 ohm.
1 joule = 0.239 calories

Pulp Mills

Hog fuel, consisting of a pulverized mixture of wood residue including bark, has been used continuously in the pulp and paper industry since the industry started in British Columbia. The hog fuel has been used in the manufacture of pulp and paper usually mixed with bunker C oil to heat the steam boilers for the pulping, power generation and heating processes. Hog fuel is naturally very moist and considerable energy must be expended to rid the moisture and thereby permit efficient burning. For this reason hog fuel has a very low value to the user. In the past it has been looked at as a problem requiring disposal. With the increasing demand for energy in B.C. the opportunities for expanded utilization of hog fuel are becoming apparent. Current prices paid for hog fuel range from nil to $10.00 per BDU and transportation allowance of up to $10.00 per BDU.

A potential supplemental supply of hog fuel is available from sawmill residue produced by small mills that currently burn or bury their waste. It also includes the increasing volume of log sorting waste, a residue that up to the present has been burned or trucked away to some convenient landfill. The option to dispose by burning or burying is rapidly disappearing as the environmental restrictions are tightened. Larger saw mills are already delivering their hog fuel to pulp mills or other markets. In the remote locations these mills continue burning in approved burners.

Most of the operations canvassed indicate that hog fuel supply and demand are in balance although the Celgar Pulp in Castlegar is forecasting a reduction in demand when the new mill expansion is complete. Co-generation proposals for this area and other areas in the province will probably mean that overall demand for hog fuel will increase to permit eventual full utilization of supply. Weyerhauser in Kamloops have advised that they will not purchase hog fuel that has been stored on the ground as the contamination creates problems in the furnaces and boilers.

Co-generation of power

Where practical, the use of hog fuel by pulp mills or to manufacture fuel pellets may solve the residue problem, but by far the largest potential within B.C. is the move to construct co-generation plants that produce electric power, steam or heat. A Cabinet program designed to permit linking of co-generated electric power into the B.C. Hydro system and thus delay the need for new large scale power generation facilities by the public utility has been initiated. A copy of the Provincial news release is attached as Appendix IV.

A co-generation plant is under construction in Williams Lake and at least three other large scale facilities are actively being considered for other locations in B.C. Pre-feasibility studies have been completed for a 110 megawatt plant in Houston B.C. that would utilize between 830,000 and 1,380,000 BDUs of hog fuel and other sawmill residue from locations between Vanderhoof and Hazelton. Another mill is scheduled for the Sechelt peninsula at Gibsons Landing. In the Kootenay area the feasibility of a co-generation plant in the Skookumchuck or Fernie area is being investigated. Other medium and small scale plants are being investigated by some of the larger sawmill and pulp operators in many areas of the province.

Green houses

Realistic options are available in the Fraser Valley area in particular for the use of sawmill residue in the form of hog fuel to heat large greenhouses. Some of these greenhouses cover areas from 2 to 18 acres and heating plants require major capital investments as well as large energy supplies. Nursery operators with large greenhouse operations throughout the province have been contacted regarding the use of hog fuel for heating.

Those who have converted to wood fuel claim a cost savings over oil or natural gas of at least 50%. The cost of wood fuel relates mainly to the cost of transportation to the greenhouse from the sawmill or planermill, which ranges from $5.00 to $23.00 per GPU. Many of the users have no direct contact with the producing mill and rely on bulk fuel dealers to take care of their fuel needs. The capital cost of a hot water boiler for greenhouse heat ranges from $100,000 for a natural gas furnace to $250,000 for a wood fueled furnace. Heating costs vary according to the use of the greenhouse but sources contacted have indicated their cost of heating ranges from $0.33 with sawdust to $0.75 with natural gas.

Dry Kiln

Some of the small mills canvassed in this study were using hog fuel from their sawmill to generate heat for their own dry kilns. With the European lumber market now demanding all lumber to be kiln dried within the next year there will be a major increase in the need for new dry kilns, particularly on the B.C. coast where conventionally lumber has been marketed green or unseasoned. For most of the small mills registered under Category II of the SBFEP, use or installation of kilns is not practical. Most of these mills will continua to sell green and rough lumber in the domestic market. The expected increase in kiln establishment will, however, offer an additional opportunity for sale of hog fuel.

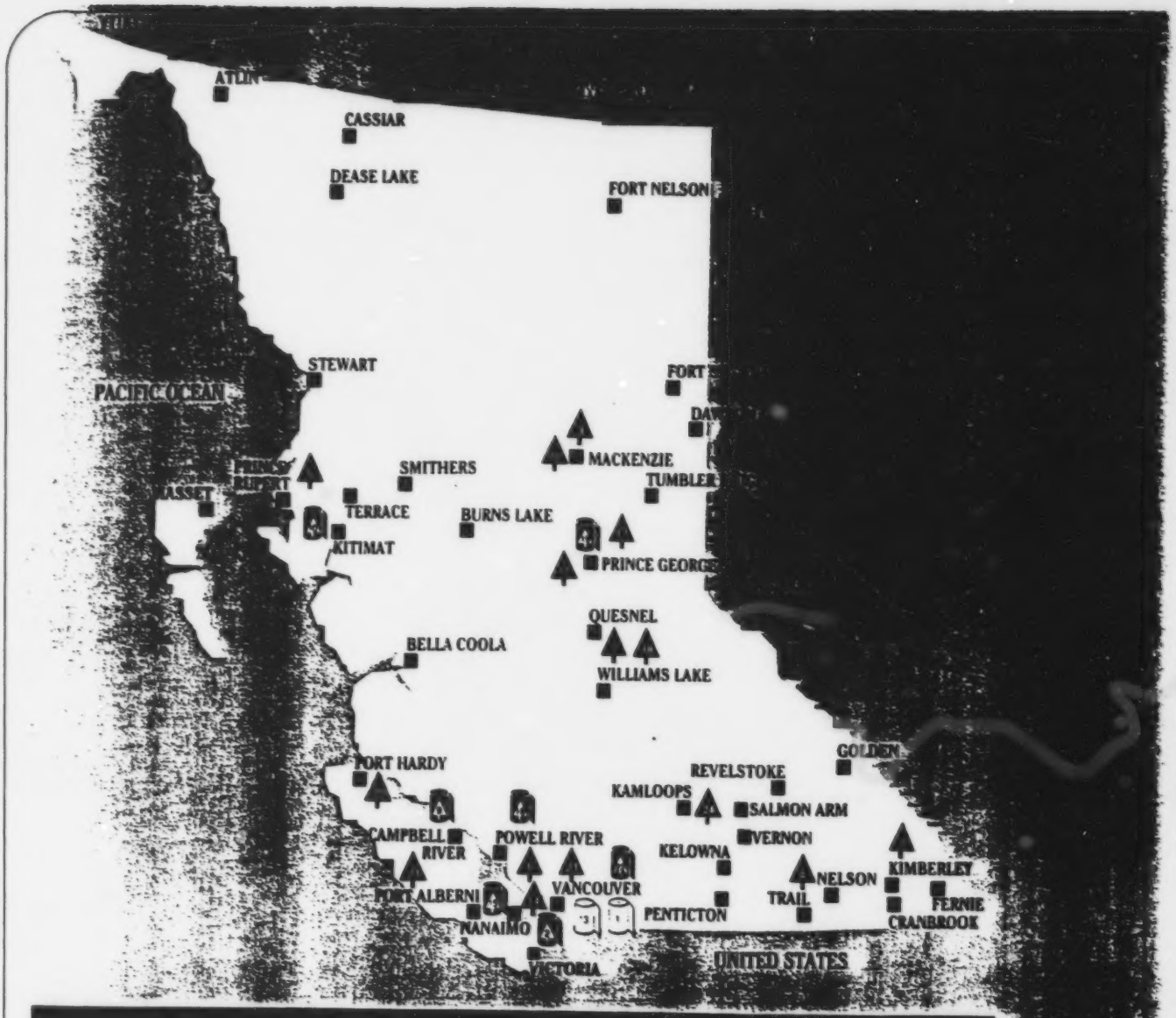
4.5.3 Special Wood Products

The most attractive option for mill operators to utilize their residual wood material is to be able to sell it as manufactured wood products at a profit. Essential to this option is the ability to separate the materials at the mill. With the exception of those cutting dead wood or logs with little bark the first need is to have a debarker. There are portable or semi-portable barker systems available that can be utilized by log handling yards and by small sawmill operations although the minimum sawmill size for economical debarking is probably between 10 and 20 Mfbm per day.

Chips

The manufacture of pulp and paper products is extremely important throughout British Columbia. The publication *major primary timber processing facilities in B.C.* 1990 edition lists the location and size of 24 processing plants in the province. The schematic map following shows the major plant locations. The major wood product used by these plants is wood chips manufactured as residual by-product material from sawmills within the province. Additionally there is currently a surplus of chip material in the province and this is exported to U.S. and offshore markets.

The map placed on the following page shows the location of the pulp and paper plants within British Columbia.



Pulp and Paper Mills

▲ PULP ▲ PULP AND PAPER ▲ PAPER

1. Belkin Paperboard Limited, Burnaby
2. British Columbia Forest Products Limited, Crofton
3. British Columbia Forest Products Limited, Mackenzie
4. Westar Timber Ltd., Castlegar
5. Westar Timber Ltd., Prince Rupert
6. Canadian Forest Products Limited, Port Mellon
7. Cariboo Pulp and Paper Ltd., Quesnel
8. Crestbrook Pulp and Paper Ltd., Skookumchuk
9. Crown Forest Industries Ltd., Duncan Bay (Elk Falls)
10. Eurocan Pulp and Paper Co. Ltd., Kitimat
11. Finlay Forest Industries Ltd., Mackenzie
12. Intercontinental Pulp Ltd., Prince George
13. Island Paper Mills Ltd., Annacis Island
14. MacMillan Bloedel Limited, Harmac
15. MacMillan Bloedel Limited, Port Alberni
16. MacMillan Bloedel Limited, Powell River
17. Northwood Pulp and Timber Ltd., Prince George
18. Quesnel River Pulp Co. Ltd., Quesnel
19. Prince George Pulp and Paper Limited, Prince George
20. Western Pulp Ltd., Port Alice
21. Western Pulp Ltd., Squamish (Woodfibre)
22. Scott Paper Ltd., New Westminster
23. Tahsis Company Limited, Gold River
24. Weyerhaeuser Canada Ltd., Kamloops

SCALE

0 100 200

Kilometres

STERLING WOOD GROUP INC.

Conversion and recovery factors are somewhat variable for different wood species and in different locations of the province. The following table is presented to assist mill operators to calculate recovery potential and economics for chips and pulpwood. Conversion factors for species used for pulpwood in the interior regions of B.C. are similar to those shown in the table.

Table #3

Conversions

Species	Bone Dry Unit (BDU)	Gravity Packed Unit (GPU)	Solid Wood equivalent m3
Douglas fir	1	.83	2.93
Hemlock	1	.77	2.72
Cedar	1	.63	2.22

Notes:

i) conversions are approximate

ii) approximately 5.810 m3 of chips needed to produce 1 air dried tonne of kraft pulp.

iii) average sawmill produces 37% of solid wood input into by-product chips.

Definitions:

i) 1 BDU is equivalent to 2400 lbs of oven dried wood

ii) 1 GPU is equivalent to 200 cubic feet of gravity packed chips (approx. 70 cubic feet of solid wood)

iii) 1 cubic metre is 35.314 cubic feet

Chips useable for manufacture of pulp must meet specific quality standards including percentage of bark included (usually 1% or less), size (limited oversize and fine material), species (some species must not be mixed in the chip bin). Prices paid for chips vary depending on pulp markets, chip supply, species and location of the mill. Chip prices are usually negotiated or set on a quarterly basis although it is becoming more common for pulp mills to negotiate for residual chips from the local sawmills based on a formula that relates price paid for chips to the net price received by the pulp mill for an air dried tonne of kraft pulp. The percentage is variable but is usually in the range of 8 to 11 % of the pulp price. The sawmill operator is also usually given a transportation allowance to cover the cost of delivering chips from the sawmill to the pulp mill.

Current prices obtained from representative pulp mills on the Coast of B.C.:

	hemlock - balsam	$60.00 to $63.00 per BDU
	fir	$55.00 per BDU
	western red cedar	$38.00 to $40.00 per BDU

In the interior, most mills purchase chips on a formula basis with current prices for whitewood chips ranging between $45.00 and $53.00 per BDU f.o.b. the sawmill. The pulp and paper market has been depressed since late in 1990 and the forecast for 1992 is for a gradual recovery over the next 12 months. The current depressed market does not allow much profit to the sawmill operator for residual chips. Increase in demand is expected in the Nelson region as well as on the lower B.C. coast area over the next decade and as pulp and paper prices return to normal the demand and economic return for chips will increase.

The export of surplus chips from the province is regulated under the Forest Act and permission is usually granted for specific suppliers for periods ranging from 6 months to 5 years. The marketing of export chips by small sawmills is probably not practical except through a larger company where arrangements can be made for the export approvals.

Integrated companies with a timber supply will usually be willing to agree to supply a specific volume of sawlogs to sawmill operators who are willing to commit a reliable source of residual chips to the pulp mill. The normal arrangement is for the pulp mill to offer up to 1 m3 of sawlogs for each 2 m3 of chips supplied.

Sawdust for pulp

Sawdust is utilized to manufacture a specific grade of Kraft pulp that becomes furnish for certain grades of paper. Mills that have confirmed purchase of sawdust for pulp are Weyerhauser at Kamloops, Eurocan at Kitimat and Fletcher Challenge at Duncan Bay. Sawdust costs the pulp companies about $10.00 per GPU delivered to their mill.

Sawdust for particle board

Sawdust is also the basic ingredient for the manufacture of particle board. The market for particle board is chiefly for furniture manufacture and most of the product is used in the major manufacturing centres like Los Angeles. Recently there has been an increase in furniture manufacturing in the eastern Pacific region. Particle board plants are operating in British Columbia in Vancouver, Grand Forks and Smithers. As for the Pulp mills the price of sawdust is about $10.00 per GPU at the user mill.

Slabs and Edgings

Mills that are designed and operated for maximum lumber recovery will also have a reduced problem of waste disposal. The small mill operator that understands the markets available for lumber and the cutting standards required for the market has a major advantage over the operator that is simply cutting one product, such as ties or timbers. The mill design is also an important aspect of waste control. Band mills, for example, have a finer kerf, but sawing accuracy is also important regardless of the type of the mill.

Sawmills that do not have a de-barker have limited opportunity to utilize the slabs for chip recovery or for further use as a construction material. Some use is possible for slabs converted to rustic siding by running them through an edger.

By far the most convenient means of disposal of slabs is for firewood. Most small mills are located in areas of the province where residential wood heat is common. The operators, occasionally advertise locally and local residents come out to the mill and cut their own firewood. Many operators, however, allow the slabs to accumulate until handling becomes a problem and burning or trucking to landfill becomes necessary. Marketing of firewood is therefore an important opportunity area. Cost recovery is minimal but other more expensive disposal problems are avoided. Other operators can earn a profit by selling the slabs to an established firewood dealer who cuts and sells the firewood. Provincial campgrounds also consume large quantities of firewood during the summer period.
Some small sawmills re-manufacture the slabs and recover clear material which has higher unit value than their main product. If the mill does not have an edger or

resaw then sometimes the slabs can be sold to another operator who can recover fencing, small clears and lumber for garden boxes or other products.

Firewood has been prepared and marketed in supermarkets for the weekend or holiday market. This requires that the product be kiln dried, packaged and delivered to the market area. Usually the appearance of the wood is important in this market niche and slabs would not be competitive with natural firewood.

5.0 Conclusions

Survival of the small sawmill industry in British Columbia will only occur if the nature of the industry changes. The family sawmill that relies on timber from the family farm or other woodlots in the area will still continue in operation but even these mills will have to be modified to permit utilization rather than burning or disposal of wood residue.

The disposal of wood residue will continue to be a cost to operators of small sawmills. Reduction of the cost depends upon the location within the province and the changes in the market for by-products. Increasing the environmental restrictions will increase the cost burden and enforcement may force mills out of business.

Within the Cariboo, Nelson and Prince Rupert regions many of the sawmills included in this analysis were found to be too small or too isolated to be able to support the cost of de-barker and chipper facilities. In the Vancouver, Prince George and Kamloops regions most of the mills have secondary manufacturing facilities and well developed markets for residue products. Despite the problems found in the isolated regions with the small sawmills there are a number of operations that have been successful in utilizing residue. The unique solutions found by these operators may not be relevant for other mills and even in some of the regions with more advanced infrastructure there are mills that cannot at this time market residue economically..

Overall the trend in sawmill operations in the province is toward centralization with small sawmills becoming more specialized and being located closer to the larger population centres. This trend, considering the continued pressures to stop burning and landfills near the larger centres, is consistent with the findings of this report that shows much more utilization of residues in the more populated regions.

One of the problems encountered by all woods operators throughout the province is that some of the areas contain a high component of defective or low grade timber. The operator, faced with utilizing this type of timber, will undoubtedly be forced to deal with a higher proportion of residual material than the operator with sound logs.

The opportunities to utilize wood residues profitably are becoming more extensive as technology improves the sawmill operators ability to recover, separate and handle the material. This study determined that some of the evolving uses for wood residue within British Columbia require more technical and scientific study. The provincial Ministry of Agriculture and the federal Ministry of Fisheries have suggested that they would like to cooperate in providing extension services to the forest industry to encourage more agricultural use of wood residues. The provincial Ministry of Industry and Small Business Development is already actively promoting the expanded use of wood residue for power generation within the province.

The larger demand is particularly evident for energy despite the relatively low cost of both natural gas and electrical energy within most of British Columbia. The provincial initiative to promote the co-generation of energy by industry has reached the operational stage in one part of the province and pre-feasibility studies indicate that many other facilities will be planned to utilize hog fuel wood waste as soon as environmental studies, BC Hydro approval and financing can be arranged. The approved environmental credit of up to 25% of the basic cost of generating electrical power for electrical energy produced in these proposed co-generation plants will encourage additional interest from industry.

The consultants have also determined that the agricultural uses of wood residues are expanding and many of these uses are more applicable to the small mills because the remote location of many of the sawmills is near to areas with agricultural demand.

Some of the small sawmill operators have partially solved the wood residue problem through increased recovery of lumber products of higher value. Even with the reduced volume, however, the need to resolve utilization problems is important. The simple installation of de-barkers and chippers will not be a practical solution for many of the small mills and some of the agriculture and energy uses should be developed further with these mills. Furthermore, if the new uses are to be developed the small mill operators must have some marketing assistance or technical advise to help in product and market development. Those mills that do invest in facilities to increase the utilization of mill residue will have to have some assured supply of timber before financing will be approved. This may present a problem for some mills as the size of some of the Category II timber sales is not large enough to amortize large capital investment.

The solution to some of the problems of volume or scale of business may be resolved through cooperative ventures with other operators or through the evolution of residue merchandisers or residue brokers. There are already bulk wood waste trucking businesses in the more populated centres.

6.0 Recommendations

The following recommendations are presented for action by the Ministry of Forests. Some of the recommendations will require coordination with other provincial and federal agencies.

(i) The Ministry of Forests should consider exempting small sawmills from the requirement to install de-barking and chipping facilities if the operator is making significant progress toward full utilization of the wood residues.

(ii) Sawmills that are cutting damaged or decadent timber should also have exemption based upon the marginal economics of the timber supply.

(iii) In areas of the province with a large component of decadent or damaged timber the SBFEP should be encouraged to develop chipping, hog fuel and other wood residue operations with lumber as by-product material.

(iv) It is recommended that the Ministry of Forests form a task force consisting of representatives of the interested agencies and bodies within the province to promote further use of waste wood residues.

(v) The formation of cooperative ventures and the waste wood brokerage industry should be encouraged through government initiative. Small sawmill operators need to have advise on the market potential for their residues.

(vi) The encouragement of smaller co-generation facilities is also recommended to assist small operators to market hog fuel. The smaller plants will mean that haul distances will not exceed the economic limit for more isolated mills.

B.C. Sponsored Reports

Simons Strategic Services Division B.H. Levelton & Associates Ltd. Canadian Resourcecon Limited, February 1991, "Towards Improved Utilization of Forest Industry Mill Residues in British Columbia"

Province of British Columbia, July 1991, "Major Primary Timber Processing Facilities in British Columbia"

Stewart & Ewing Associates Ltd. (Seafor) F.B.M. Consulting Ent. J.F. McWilliams, August, 1990, "British Columbia Forest Industry Mill Residues for Calendar Year 1989

Province of British Columbia, 1985, "British Columbia Facts and Statistics"

BC Environment, Terri Kinrade and Dan Flegel, December 1990, "Mill Residue Handling in Kootenay Region"

Sandwell Inc. for Thompson Okanagan Forestry Industry Task Force, December 1991, "Wood Residue Utilization Study"

FERIC Reports

Forest Engineering Research Institute of Canada, July 1990, "Trial of a Double-Drum Flail Delimber/Debarker Processing Small-Diameter Frozen Timber"

Forest Engineering Research Institute of Canada, Vancouver, BC, June 1988, "Economic Feasibility of Satellite Chipping Yards in Alberta by James E. MacIntosh Alex W.J. Sinclair"

Forest Engineering Research Institute of Canada, Eastern Division, September 1990, "Field Note No. Processing-19 A Small-Scale Delimber-Debarker-Chipper Prototype"

Forest Engineering Research Institute of Canada Alex W.J. Sinclair, April 1981, Utilization of Coastal British Columbia Log Sortyard Debris

Forest Engineering Research Institute of Canada, Eastern Division, Keith A. Raymond, Gordon S. Franklin, November 1990, "Malenfant Prototype Chain Flail Delimber-Debarker: Productivity and Chain Wear"

Forest Engineering Research Institute of Canada, Eastern Division, Michael P. Folkema, R.P.F., February 1990, "Delyle Firewood Splitter-Conveyor

Alberta Sponsored Reports

Silvacom Ltd., January 24, 1990, "Residue Inventory For the Bow Crow and Rocky Mountain House Regions (Part 1)"

Silvacom Ltd., March 31, 1990, "Wood Residue Utilization in the Crowsnest Pass Region A Pre-Feasibility Study (Final Report)"

Solutions Management Group Inc. W.R. Dempster & Associates Ltd., Alberta Research Council, 1990, "An Analysis of Wood Residues in Alberta"

Summary of Proceedings, October 1991, "Forestry Conference '91 Edmonton, Alberta on Woodlands Technology and Residue Disposal/Utilization

Appendix I

News Release-Category II Sawmill Operations

Province of
British Columbia

NEWS RELEASE

MINISTRY OF FORESTS
HON. CLAUDE RICHMOND, MINISTER

FOR IMMEDIATE RELEASE

1991:63

May 30, 1991

FOREST SERVICE TO IMPLEMENT RECOMMENDATIONS OF TWO REPORTS ON SMALL BUSINESS PROGRAMS

VICTORIA -- Forests Minister Claude Richmond announced today that small sawmill operators under the Small Business Forest Enterprise Program will have access to more timber, effective immediately.

"I have directed the Forest Service to begin advertising extra timber sales which will be designed to encourage sawmills to supply lumber to remanufacturing plants in the province," Richmond said.

The decision, the minister explained, is in keeping with the Forest Service's intention to implement most of the 32 recommendations made in two reports on small forest enterprises.

"This will help small sawmills, which play an important role in many areas of the province, and it will give remanufacturers access to the specially cut lumber the small sawmills produce," Richmond said.

Richmond also announced changes to the Small Business Forest Enterprise Regulation which will prohibit new sawmills from entering the program and require existing sawmills to have chippers and de-barkers to reduce waste and ensure that logs are fully used.

The change to prohibit new sawmills will ensure that as the timber supply is increased, a proliferation of new sawmills does not occur.

"B.C. already has sufficient sawmill capacity," Richmond said.

The minister said exemptions to the chipper and de-barker requirement will be given to sawmills that do not burn slabs and edgings. Some sawmills sell slabs for firewood and sawdust for livestock bedding, and exemptions are appropriate in those cases. Requests for exemptions will be reviewed by local sawmill associations which will then make recommendations to the minister.

- more -

Richmond said another of the recommendations made in the reports calls for an expansion of the Woodlot Program on the basis of demand, suitability of sites, and the Forest Service's ability to administer the program with existing resources.

"While we may not be able to expand this program to the extent that we would like at this time, because additional manpower and resources cannot be provided until the province's economy improves, it is our goal to greatly expand the program in the long-term," Richmond said.

"Because our Small Business Forest Enterprise Program and our Woodlot Program are key components of our forest industry and because substantial changes were made to them in 1988, we felt it was time to assess their progress. Therefore, last September, I appointed David W. Gillespie, a partner in the Kamloops law firm of Webber Gillespie Renkema Burke, to review the two programs."

Earlier, the Forest Service had commissioned a 14-member committee, consisting of representatives of the various forest-industry sectors and headed by Wes Cheston, assistant deputy minister of forests, to examine bid proposal sales under the Small Business Forest Enterprise Program, said Richmond.

Bid proposal sales are designed to stimulate value-added manufacturing.

Both the Gillespie report and the committee's report were released in February this year and the public's comments were sought on the total of 32 recommendations.

"I have thoroughly reviewed all the written comments, and I have directed the Forest Service to implement most of the recommendations.

"We are now refining the two programs so that we can better address the needs of small forest enterprises," the minister said.

- 30-

EDITORS/NEWS DIRECTORS NOTE: SUMMARY OF RECOMMENDATIONS ATTACHED

CONTACT: Bill Howard, Manager
Small Business Programs
Phone: 387-8307

Appendix II

Mill Reports - Case Studies

Mill Reports - Case Studies

Six small sawmill operations which responded in the initial canvassing carried out for this study were visited in a follow up program to corroborate the residue handling activities and to determine whether the markets and utilization for these mills could be extended to other mills in the province.

The six mills were located in the southern interior of the province and are representative in size of many of the Category II mills in the province. The lumber and residue product markets for these mills are varied and show the distinctive character of the average sawmill entrepreneur in B.C.

LUIGI RUSSO SAWMILLS

Specialty:

This mill markets all its residue for mulch, bedding, firewood or utility lumber, and has no waste left for disposal.

Sawmill Description:

- circular saw head rig
- 3 sided chip & saw
- planner
- morbark portable chippper
- 8 employees

Wood Supply:

Douglas fir, spf, and ponderosa pine from small licence, category 2 sales, and private timber.

Timber Products:

Ties
Dimension lumber
1" utility grade boards

Residue Products:

Utility lumber	-	produced, with a high percentage of wane, from slabs processed through the chip & saw. These are marketed on the prairies to use in wind breaks.
Firewood	-	produced from slabs and sold locally.
Mulch	-	is from chips produced by the chip & saw and morbark chipper, combined with sawdust and sold to local landscapers for $4 per cubic yard.
Animal bedding	-	from sawdust and planner shavings is sold to farmers.

Residue Disposal:

No residue left to dispose.

Comments:

Considerable wane is acceptable in the utility lumber for the windbreak market. The net effect of high acceptable wane combined with the chip & saw is a very good recovery rate.

Mulch commands high prices from the growing local urban market. Increased growth is expected to increase prices and will compete with local pulp chip prices.

Future plans include a debarker and producing chips for the pulp market.

Contact: Luigi Russo, owner/manager
982 Old Vernon Road, Kelowna, B.C., V1X 6TB
Phone: 765-5281 Fax: 765-5899

MILESTONE WOOD PRODUCTS INC.

Specialty:

Produces briquettes with some of the wood residue and uses the remaining to power dry kilns.

Sawmill Description:

- band saw head rig
- edger
- hogger
- chipper
- reman mill attached

Wood Supply:

Category 2 16.1 sales, and buying and trading timber.

Timber Products:

Laminated window blanks - for markets in Germany, Austria and Switzerland. The preferred product is edge-grained clears.

Residue Products:

Hog Fuel - for dry kilns uses up the hogged slabs, edgings, and sawdust.

Briquettes - made from chipped trim ends and shavings are to be marketed for residential stoves and fireplaces.

Residue Disposal:

No residue to dispose.

Comments:

A modern mill with a relatively low recovery. The mill accumulates a high waste volume as its' focus is on producing clear wood products.

The briquette market is new and the economics unknown.

Contact: Fritz Leutgeb, President
4175 Crozier Road, Armstrong, B.C., V0E 1B0
Phone: 546-3765 Fax: 546-3253

HP MILLS KELOWNA LTD.

Specialty:

This mill markets all wood residue to local farmers, a nursery and a firewood contractor.

Sawmill Description:

- 54" circular saw head rig with a carriage
- edger
- planner with trim saw
- hogger (recent purchase for $40,000 U.S.)
- 12 employees

Wood Supply:

Douglas fir and larch from category 2 sales, and 10% from private timber.

Timber Products:

Ties
Studs - to the domestic market and Douglas fir studs to the Australian market.
Clears and shop grade - to a Vancouver reman plant.
Specialty items - to the local market.

Residue Products:

Firewood - produced from large slabs by an onsite contractor. The firewood is marketed to parks and locals. This mill recovers $7 per cord for slabs and $15 per cord for log ends.

Mulch/Bedding - produced from hogged small slabs and edgings, sawdust, and shavings. Marketed to local farmers and a nursery at $35 per truck load (approximately 6 GPU).

Residue Disposal:

No residue to dispose.

Comments:

Appeared to be a well run tidy sawmill.

Contact: Ruth Petersen and Kathleen Wirachowsky, owners/managers
745 Rose Avenue, Kelowna, B.C., V1Y 5K1
Phone: Fax:

BERNIE BREWER

Specialty:

Marketing slabs for rustic siding.

Sawmill Description:

- circular saw head rig with a carriage
- edger
- separate scragg mill

Wood Supply:

Almost 100% category 2 sales.

Timber Products:

Ties
1" boards
blanks - produced for a lower mainland reman plant. Much better price than the dimension lumber.

Residue Products:

Rustic siding - at $1 each is produced from the better slabs. These are marketed locally and have been used on a local bakery, coffee shop, animal shelters and sheds.

Firewood - from slabs.

Residue Disposal:

Most of the residue is burned once a year.

Comments:

A green chain would improve sorting and increase "good" slab production to about 250 per day. Slabs are fairly uniform with trimmed ends and partly barked from the logging process.

Contact: Bernard T. Brewer, owner/manager
Box 38, Comp 13, Tulameen, B.C., V0X 2I0
Phone: Fax:

D & D LOGGING - 4 x 4 SAWMILLS

Specialty:

This mill utilizes logs down to a 2" top and markets some of its residue.

Sawmill Description:

- scragg mill
- log merchandiser to cut to a 2" top
- debarker
- chipper
- hogger

Wood Supply:

Lodgepole pine from category 2 16.1 sales, and trades with Weyerhauser.

Timber Products:

Cants - for Greenwood Forest Products
Posts and Rails - for Princeton Wood Preservers.

Residue Products:

Firewood - produced from slabs and given away locally.

Animal bedding - from sawdust is given away to farmers.

Hog fuel - to be used by a turf farm.

Residue Disposal:

Remaining residue is burned in a pile.

Comments:

Full length trees are brought in and trimmed to a 2" top. The logs are sawn to a 4.5" top to produce the cants, and the tops are sized for fence posts. Despite the small logs the recovery is 224 fbm per cubic metre.

The barker, chipper and hogger have just been purchased and when completely installed with ancillary equipment will have cost over $225,000. There are three buyers for the hog fuel.

Contact: Dennis Dean and Wade Walker, owners/managers
Box 307, East Bench Road, Okanagan Falls, B.C., V0H 1R0
Phone: Fax:

Appendix III

Information Sources (Contacts)

STERLING WOOD GROUP INC.

Contacts Made - March 1992 - Market Opportunities-Sawmill Waste

Ref # Sec.	Name		Affiliation	Phone #	Purpose of Contact
4.5.1	Cebula	Randy	The Answer Garden Products Ltd.	856-6221	Composting
4.5.1	Chase	Rick	The Answer Garden Products	856-6221	Composting
4.5.1	Gay	Terry	Farquarson Farms	334-9719	Composting
4.5.1	Holbeck	Neils	UBC Experimental Farm	923-4219	Composting
4.5.1	Paulson	Stewart	Ministry of Agriculture & Fisheries	852-5226	Composting
4.5.1	Van Kleek	Rick	Ministry of Agriculture	852-5363	Composting
4.5.2	Bulford	Dan	Ministry of Economic Development	549-5593	Co-generation
4.5.2	Dybie	John	Ministry of Economic Development	356-8707	Co-generation
4.5.2	Jackman	Bob	Min. Ec. Devel. & Sm. Bus.	847-7215	Co-generation
4.5.2	Penner	Wally	Min. Ec. Devel. & Sm. Bus.	354-6113	Co-generation
4.5.2	Winter	Lee	Gro Well Industries Ltd.	748-4223	Co-generation
4.2	Johnson	Carl	BC Environment	354-6355	Environment Regulations
4.2	Kinrade	Terry	B.C. Environment	354-6355	Environment Regulations
4.5.3	Jarvis	Wayne	Weyerhauser Canada	372-2217	Markets chips & residue
4.5.2	James	Fred	BC Utilities Commission	660-4700	Natural gas rates
4.5.2	Eurosa Gardens Ltd.			652-5812	Nursery heat
4.5.2	Houweling	Casey	Houweling Nurseries	644-6491	Nursery heat
4.5.2	Pelton	Steve	Pelton Reforestation	465-5411	Nursery heat
4.5.2	Ruff	Otto	Ruff Green houses	963-7722	Nursery heat
4.5.2	Thomas	Dieter	Malaspina college, Horticulture Program	753-3241	Nursery heat
4.2	Blon	Frank	MoF Kamloops Region	828-4131	Sawmill residues
4.2	Gagne	Sheldon	MoF Prince Rupert	847-7545	Sawmill residues
4.2	Irwin	Terry	MoF Prince George Region	565-6100	Sawmill residues
4.4.2	Sauder	Tony	FERIC	228-1555	Technical (handling)
4.4.2	Sinclair	Alex	FERIC	228-1555	Technical (handling)
4.4.3	Zabo	Ted	Alberta Forestry	(403)422-7011	Technical (handling)
4.5.2	Weston	Darcy	Weston's Turf Farm	743-4879	Turf Farm
4.5.3	Boud	Reg	Northwood Pulp & Timber	962-9611	Wood residue markets
4.5.3	Parker	Fred	Celgar Pulp Company	365-7211	Wood residue markets
4.5.3	Chamber	Dave	DCT Chamber Trucking	549-2157	Wood residue markets

STERLING WOOD GROUP INC.

Contacts Made - March 1992 - Market Opportunities-Sawmill Waste

Ref # Sec.	Name		Affiliation	Phone #	Purpose of Contact
4.5.3	Dalgleish	Andy	Cariboo Pulp & Paper	992-0253	Wood residue markets
4.5.3	Joiner	Blake	Joiner Sales Corp.	533-4722	Wood residue markets
4.5.3	Kelly	Dave	Eurocan Pulp & Paper Co.	632-6111	Wood residue markets
4.5.3	Mercer	Wayne	Crestbrook Forest Industries	422-3261	Wood residue markets
4.5.3	Stevens	Don	MB Ltd.	661-8000	Wood residue markets
4.5.3	Thomson	Mike	Fletcher Challenge Ltd.	654-4246	Wood residue markets
4.5.3	Williams	Jim	CPFP Ltd.	640-3453	Wood residue markets

Appendix IV

News Release-Energy Conversion

Province of British Columbia

NEWS RELEASE

MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES

FOR IMMEDIATE RELEASE

1991:66

September 18, 1991

ELECTRICITY FROM WOODWASTE TO CLEAN UP AIR AND SPARK NEW JOBS

Victoria - A new program of B.C. Hydro power purchases which will give an economic boost to generating electricity from forest woodwaste, cut back pollution from existing woodwaste burners, and create quality jobs in B.C. was announced today by Energy and Mines Minister Jack Weisgerber and Environment Minister Dave Mercier.

"This means that less woodwaste will just 'go up in smoke,'" said Weisgerber. "Instead, it will be used efficiently and add to B.C.'s electricity supply."

"Strict emission controls on the energy from woodwaste plants will put a stop to air pollution from beehive burners in a number of B.C. communities," added Mercier. "The smoke from beehive burners contributes to respiratory ailments, visual blight and fall-out of dirt and soot."

Hydro will issue a "woodwaste-only" proposal call later this year to identify the projects which are most competitive and which help the areas of the province most affected by woodwaste burning. After a commercial review by Hydro and an environmental and regulatory review by government, contracts for about 110 megawatts of power--enough for about 70,000 households--will be signed with the successful companies.

Under the program, B.C. Hydro will give environmental credits on top of its normal power purchase price to qualifying independent producers using woodwaste as their sole fuel to

. . ./more

generate electricity. The credits, to be paid through Hydro's rates, recognize the extra costs for fuel handling and transportation as well as the environmental benefits from phasing out beehive burners.

Credits would be applied case-by-case and only as necessary to make selected projects economically feasible, but would go no higher than 25 per cent more than Hydro's alternative cost of power. Power export projects would not be eligible for the credit.

The environmental credits extend the earlier environmental premiums program which was established with the 55-megavatt generation station now under construction in Williams Lake. With project start-up in 1993, six local beehive burners will be phased out.

- 30 -

For further information contact:

Irwin Henderson, Director
Communications and Public Affairs
(604) 387-5178

Province of
British Columbia

NEWS RELEASE

Ministry of Forests
For Immediate Release
December 1, 1992

Contact: Bill Howard, Manager
Small Business Programs
Phone: 387-8307

1992:118

Report recommends new uses for wood waste

VICTORIA -- A report which recommends innovative new uses for wood waste from small sawmills was released today by Forests Minister Art Charbonneau.

Market Opportunities for the Utilization of Wood Waste Generated by Small Sawmills recommends ways for small sawmill operators to improve the use of residual material, such as edges, trimmings, and bark, produced in the manufacturing of lumber.

The report was prepared by the Sterling Wood Group Inc., of Nanaimo, assisted by Hugh Ney, a Nanaimo-based marketing consultant.

"Small sawmills are important to the B.C. economy and many small communities," Charbonneau said. "Disposal of waste material poses problems for many mill operators.

"The report indicates a number of innovative new opportunities that will help improve the use of wood fibre, reduce the amount of waste material, and generate additional revenue. This is much better than burning or throwing the waste away."

Some possibilities for wood waste include the use of:

- sawdust for livestock bedding, garden nurseries, and pathways;
- wood pieces and sawdust for composting of septic, aquaculture, and livestock waste;
- ground-up bark for seed bedding at turf farms; and,
- edgings and trim pieces for residential firewood.

"In many cases, operators of small sawmills cannot afford log debarkers and chippers," the minister said. "In these cases, use of edgings and trim ends is hampered because they still have bark attached.

-more-

VICTORIA, B.C.

Recycled Paper

"There are a number of new opportunities for participants in the Forest Service's Small Business Forest Enterprise Program," Charbonneau said. "The possibilities discussed in the report will help increase the uses for wood waste products and help diversify B.C.'s small sawmill industry."

The report also recommends that representatives of interested agencies, including the Ministry of Agriculture, Fisheries and Food, co-operate to promote further use of wood residues and develop marketing advice for small sawmill operators.

"Forest Service staff will continue to work with sawmill operators to vigorously pursue these opportunities," the minister added.

Copies of the report are available from the timber harvesting branch in Victoria.

-30-